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by HABERLANDT, he reports uniformly positive results, both with and without the darkening of the petiole; whence he concludes that "the lens-function does not stand in direct causal connection with the perception of the direction of light by the leaf-blade."—C. R. B.

**Branching in palms.**—In 1892 MORRIS<sup>13</sup> brought together what had been recorded concerning the branching of palms, which was regarded as an abnormal phenomenon. RIDLEY,<sup>14</sup> who has had eighteen years of experience in the oriental tropics, has now much extended our knowledge of this phenomenon. He believes that the greater number of palms are branched at least at base, and that the production of a single axis from a seed may be regarded as the "abnormal" condition. Lateral buds are produced at or near the base, and these become erect stems, in some cases the whole plant eventually becoming a bush; or these lateral buds may develop as subterranean branches that send up a succession of erect stems (branches). Heretofore the branching of palms has been thought of only in connection with the crown, but RIDLEY's observations indicate that the group is perhaps characterized by a tendency to basal branching.—J. M. C.

**Spirogyra.**—Dr. FRITSCH and Miss RICH<sup>15</sup> have begun a series of studies of the British freshwater algae, the first one dealing with Spirogyra. The principal topics are: "The occurrence of Spirogyra in nature," "The reproduction of Spirogyra in nature," and "Points of systematic interest." The species examined were either purely vernal or exhibited both a vernal and an autumnal phase. The autumnal appearance of certain species is thought to be due to certain external conditions that cause a small number of zygospores to germinate. "Reproduction takes place ordinarily in the vernal phase, and is most probably the result of certain periodically recurring combinations of factors, which vary for different species;" in support of which view the authors present a considerable number of data.—J. M. C.

**Limiting factors and growth.**—A. M. SMITH, late a pupil of BLACKMAN at Cambridge, has carried out a thorough study of the rate of growth in a number of plants at different stations in Ceylon, applying to the discussion of his results<sup>16</sup> BLACKMAN'S fruitful theory of limiting factors. In *Agave* and *Furcraea* tem-

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<sup>13</sup> MORRIS, DANIEL, On the phenomena concerned in the production of forked and branched palms. *Jour. Linn. Soc. London Bot.* 29:281. 1892.

<sup>14</sup> RIDLEY, H. N., Branching in palms. *Annals of Botany* 21:415-422. *pls.* 34-39. 1907.

<sup>15</sup> FRITSCH, F. E., and RICH, FLORENCE, Studies on the occurrence and reproduction of British freshwater algae in nature. I. Preliminary observations on Spirogyra. *Annals of Botany* 21:423-436. 1907.

<sup>16</sup> SMITH, A. M., On the application of the theory of limiting factors to measurements and observation of growth in Ceylon. *Annals Roy. Bot. Gardens Peradeniya* 3:303-375. *pls.* 22-25. 1907.

perature (probably the internal temperature of the growing parts) always was the limiting factor, while in *Dendrocalamus* sometimes the water supply, sometimes the temperature was limiting. In *Capparis* and *Stiffia* it seems to be the water supply by day and temperature by night; in *Vitis* the temperature in January, and the water supply in July. The paper is a most suggestive one. It seems quite likely the conflicting data on growth can be harmonized by further study along this line.—C. R. B.

**Infectious chlorosis.**—BAUR<sup>17</sup> reports that the variegated forms of *Ligustrum vulgare*, *Liburnum vulgare*, *Fraxinus pubescens*, *Sorbus aucuparia*, and *Ptelea trifoliata*, which are propagated by cuttings, owe their yellow or variegated leaves to an infectious chlorosis like that recently described in detail for *Abutilon Thompsoni*. A yellow variety of *Ptelea trifoliata*, however, which can be grown from seed, is a true *aurea*-form, and its condition is not transmissible by infection. BAUR expects to find this disease widespread, when time avails for examining the many wild and commercial variegated-leaved plants. He intends to make his next task the isolation of the problematic infecting material.—C. R. B.

**The primary uredospore.**—CHRISTMAN<sup>18</sup> has investigated the development of the so-called primary uredospore of *Phragmidium potentillae canadensis*. He brings out the resemblance between the true aecidium and the primary uredo, the spores in the two cases being morphological equivalents. The relation of these results to the life-history as a whole is presented in a later paper published in this journal.<sup>19</sup>—J. M. C.

**Anaerobic respiration.**—STOKLASA and his collaborators<sup>20</sup> report further successful isolation of the enzymes which in the absence of oxygen break up carbohydrates in plant cells into lactic acid, and then into alcohol and CO<sub>2</sub>. Zymase is responsible for the lactic acid; lactacidase for the alcoholic fermentation, with hydrogen as a by-product. This seems indirectly to support POLLACCI's hypothesis that in photosynthesis we have reduction of CO<sub>2</sub> by H.—C. R. B.

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<sup>17</sup> BAUR, ERWIN, Ueber infektiöse Chlorosen bei *Ligustrum*, *Laburnum*, *Fraxinus*, *Sorbus*, und *Ptelea*. Ber. Deutsch. Bot. Gesells. 25:410-413. 1907.

<sup>18</sup> CHRISTMAN, A. H., The nature and development of the primary uredospore. Trans. Wis. Acad. Sci. 15:517-526. pl. 29. 1907.

<sup>19</sup> CHRISTMAN, A. H., Alternation of generations and the morphology of the spore forms in rusts. BOT. GAZETTE 44:81-101. pl. 7. 1907.

<sup>20</sup> STOKLASA, ERNST, and CHOCENSKÝ, Ueber die anaerobe Atmung der Samenpflanzen und über die Isolierung der Atmungsenzyme. Ber. Deutsch. Bot. Gesells. 25:122-131. 1907.